One of the more interesting characteristics of modern societies relates to the increasing role played by information and communication technologies in everyday life; the pervasiveness of the media and the way common citizens can keep abreast of events, news and ideas produced elsewhere and everywhere in the world is an example of the previous statement.

This does not mean that we are involved in a process wherein all man-made physical reality will become immaterial or virtual; but just that most human activities require more and more incorporation of information, of essentially massless nature. Transporting people and material goods, farming, mining, manufacturing, building and food processing still require spending significant amount of energy to transport mass and to reshape or transform matter; individual services demand interpersonal, face-to-face contact, requiring displacement of individuals from one place to another.

Nevertheless, almost no human productive activity can survive without storing, processing and retrieving information. Consequently, there are many products and services which qualify under the general designation of "massless" (weightless) goods. This means they can be conceived, produced and delivered without neither physically or irreversibly transforming raw materials in any visible way nor actually transferring mass from one point to another.

Producing and broadcasting news; auditing or managing businesses; writing books, articles and theses; developing software; playing the stock exchange; doing banking operations; teaching and learning; developing theoretical research; producing many different forms of entertainment; discussing issues and taking decisions - are just so many examples of human activity that can mostly be done just by transferring data digitally between different places.

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* O autor, enquanto Presidente do ICDE (Internacional Council for Open and Distance Education), foi convidado, como orador principal, a intervir no EDIT'96, *2º Congresso Internacional da UNESCO em Educação e Informática*, que decorreu em Julho de 1996, em Moscovo. (N.E.)

This is why the expression "Information Society" is becoming more and more frequently used to characterize either the present corpus of tendencies of social organisation or some unknown (and probably still unforeseeable) steady state of the developed societies of the future.

We shall concentrate, in this paper, on just one such recognized tendency: the absolute need to provide lifelong education and training for all citizens of the world, irrespective of the level of technological and economic development of the country they belong to. Professionals need to refresh, to refine or even to reconvert their qualifications in order to match the ever-changing needs of the employment markets; common citizens need to update their basic skills at exactly the same pace as technology keeps invading their day-to-day life. The fabric of society itself will be changing continuously in keeping with the onset of new societal organizations, new daily schedules, new relations between the individual and the community, new ways of using information and communications. Hence, citizens need to keep abreast of all these changes, so as not to drift away from the decision-making process and to maintain their full capacity of intervention in their own societies and in the world at large.

In this context, it is obvious that conventional education and training can not provide adequate responses to the growing needs of literally millions of users; nor traditional ways of learning will be compatible with current jobs, family obligations and distance between residence and school or training centre. Flexibility needs to be an intrinsic part of any type of continuing education, and this includes flexibility of time, of place and of learning contents, so as to fit the diversity of individual situations, needs and degrees of freedom.

Open and distance learning methods have been used for decades to face this problem. From the beginning of the 70's, many educational systems began operating all over the world using this methodology; their basic principle of operation deriving from the postulate that all individuals are able to learn by themselves (if properly motivated), provided appropriate learning materials are made available to them and a minimum amount of interaction exists between the teaching systems and its users.

All forms of communications are, of course, relevant for the success of this learning regime: mail, telephone, fax, radio, television, audio and video recordings; e-mail, videoconferencing, computer conferencing; multimedia and all kinds of interactive materials. However, the conventional printed word on paper continues to be an essential element for efficient learning.

It is obvious that some kinds of skills and a number of subject matters can not be taught just to an isolated user, studying at home, even if linked to the teaching system by the most sophisticated telecommunications network. In same cases, experimental work can be computer-simulated (as virtual or "dry" laboratories). However, many other kinds of skills can not, or should not, drift away from the actual handling, touching or manipulating reality itself; the same applies to learning abilities of intrinsic interpersonal nature, like the ones required in medicine, psychology and some social sciences. The way out of the dilemma is to mix the distance-learning mode with the necessary amount of presencial activities, even if the pragmatic nature of distance education recommends these activities to be concentrated within a limited period of time, so as to reduce this amount of rigidity within an essentially flexible regime.

Distance teaching systems can be planned and installed as dedicated institutions, wherein the main regime of operation is based on the distance learning rationale. The more complete ones display all the functionalities necessary for this regime: developing curricula and designing learning strategies; authoring books and other subject documents; producing and distributing or broadcasting learning materials (from written, audio and video ones, to multimedia); selecting and enrolling students; providing them with appropriate mechanisms of scientific, pedagogic and administrative support; assessing knowledge acquisition and performance of students; providing academic or professional accreditation; monitoring and evaluating the operation, quality and productivity of the whole system.

In some less privileged contexts, a pragmatic approach to this kind of *single-mode institutions* may mean the sacrifice of some of the above functionalities: using learning materials designed and produced elsewhere; giving the power of assessment and accreditation to another institution; in the extreme, just being the provider of learning materials produced by someone else, to the marketplace. Excluding this last case (whereby the organization can no longer be considered as an educational institution), the corresponding savings may have some disadvantages. In most cases, learning materials include cultural references (or culture-determined styles of approach) specific to the origin of their design and contents, which may clash if transferred to another cultural context, thus making it necessary a sometimes very expensive reconfiguration or adaptation. The same reasoning applies to giving the power of assessment to an external entity, which may have criteria of proficiency divergent from those of the teaching institution.

A different kind of approach to the organization of a distance learning cooperation has been followed, with increasing frequency, by formerly conventional educational institutions, which recognize the need to provide learning to extra-mural students prevented, for some personal reason, to attend classes. By introducing a distance learning opportunity just for these students, the institution becomes a *dual-mode system*.

This option has been adopted by a growing number of conventional universities in different parts of the world, as a way to solve the dilemma created by the conflicting tendencies of the increase of demand by large contingents of prospective students and the one of shrinking operation budgets in higher education.

A more comprehensive approach to solve the same difficulties, while probably increasing the quality of teaching, would be to adopt a *mixed-mode* model of operation. Within a given institution, some subjects would be taught in the conventional, classroom way, while other ones, not requiring experimental and laboratory work, nor a significant amount of face-to-face interaction, would be dealt with in a pure distance learning mode, this solution applying to all the students within the organization. Some experiments in this particular field, involving a network of higher education institutions within the same country, are under way.

Even if a mixed-mode model of operation is not formally adopted, institutional cooperation between distance teaching systems and conventional ones, belonging to the same linguistic and cultural area, is always extremely fruitful. This cooperation is a must for single-mode institutions, so that experimental work can be made accessible to their students within conventional universities; these ones can benefit from high-quality learning materials produced by a distance learning system, to be used by their own students; cooperation in scientific and methodological research benefit both parties; interchange of academic staff will be both motivating for the individuals and profitable for the institutions involved.

The Distance Learning approach has been used successfully in vocational training, either at the initial stage or as continuing, lifelong training. When applied to the workforce of a given enterprise it frequently takes the shape of in-service training, learning activities being supported by an Open Learning Resource Centre located within the physical environment of the company. This kind of training facility usually includes a multimedia library, workstations for accessing learning materials and a number of rooms where face to face sessions can take place, led by qualified trainers. Learning activities may be formally organized at fixed times or be left to the initiative of the trainees, according to internal

rules; the mixed mode strategy, combining presencial sessions with the self-learning approach, will usually apply.

Training agencies, both public and private, provide this some kind of services to enterprises which small or medium dimension which lack of qualified trainers prevent them to install and to sustain a permanent training facility.

Even taking into account the diversity of organizations and institutions providing open and distance learning services and products, both for education and training in many countries, we are still far from having a strutured market in this field. The offer of these services and products is mostly spontaneous, rather then oriented and determined by the demand; from the latter side of the market, experience has shown that users seldom know how to characterize their exact needs and objectives. Finally, the quality of products offered and of services to be rendered is difficult to evaluate for lack of clear and complete specifications; consumer protection is, in most environments, virtually inexistent.

The significant price of ODL education and training services, when provided by private operators, make them too expensive for the current individual end-user. The fact that continuing education has not yet been recognized as an individual and social right prevents the underprivileged categories of users to access its benefits on a permanent basis.

Given the ongoing expansion of ODL systems everywhere in the world, as well as the effect of local and regional alliances currently taking place in order to share the cost of development of new products and to multiply the number of their prospective users, there is some hope that economies of scale cause the corresponding prices to drop in a significant way. This will stimulate the demand, both from enterprises and from individuals, thus furthering the tendency for decreasing the price of these services.

We can understand the structure of costs of a comprehensive ODL system by analysing the different functionalities it is supposed to assure. Contrary to conventional teaching systems, which can be considered as manpower-intensive, distance learning systems are organized as capital-intensive organizations, requiring powerful technical infrastructures. The logistic and administrative component must be powerful and efficient enough to deal with tens of thousands of students scattered in many different places, possibly very far from the physical centre of the system, and to be able to cope with their needs using a *just in time* approach. Careful planning is obviously the key for success in this operation.

The concept of self-learning is based on the availability of quality learning products, in written and multimedia format; their production is a lengthy process which needs to be finely tuned to the ever-increasing pace of technological innovation, of the evolution of standards and of the trends concerning the private possession of communication facilities, to be used by the current students.

In terms of human resources, apart from those operating these infrastructures, the teaching staff splits into two different functionalities: high level specialists of contents, as well as in educational strategies, are needed for authoring the learning products; the tutoring function has to be assured, so that a minimum of student support, educational dialogue and interactivity complements the self-learning process, either in a face-to-face or in a distance communication mode.

Due to the number and specificity of these functionalities as well as to the number of students benefiting from them, ODL systems are complex structures of significant dimension. It is only reasonable that they are designed to serve different purposes and vocations, providing many different streams of education and training, according to the nature of their users. Besides individuals, who enrol in courses and programmes on their own initiative, institutional users, both in the private and in the public sector, are frequently clients of Open and Distance Learning Systems.

Experience gained in international interchange among these systems has shown that public administrations all over the world have been using extensively this kind of facilities for in-service training of civil servants in priority areas like education, health, armed forces and local administration; teacher training and training of trainers are the most common first sectors to be addressed.

In the private sector, we recognise that institutional clients of large dimension use extensively open learning techniques to provide recurrent training to their workforce, covering a large spectrum of qualifications. This makes good sense, for they may have a large number of operating sites across a territory and ODL provides opportunities for significant reduction of the displacement of qualified trainers from one point to another. The argument is even stronger when the company operates at a transnational basis.

Small and Medium Enterprises can not usually afford the creation of their own training centres; they may even lack the know-how needed for a precise specification of their training needs. On the other hand, they are extremely vulnerable to losing competitivity by technological or methodological obsolescence. Besides needing to re-train their operating

staff regularly, it is usual they require updating of qualifications of their top and medium level directors and executives in terms of improving organisation and methods, modernising commercial procedures and marketing, introducing information and communication technologies in their whole operation.

The poor structuration of the ODL market of products and services makes it difficult for offer and demand, not only to match, but even to be accurately known by both sides. This means that, besides good and credible providers of these services, others may exist in the field, which do not fit minimum requirements of quality; consumer protection mechanisms are also at an incipient stage. This is the reason why governments have given a high degree of priority to stimulating and supporting continuous training activities in SME's, frequently through the intervention of national training agencies.

On the other hand, in what respects individual users of distance education and training many countries have created a national ODL system in the public sector, so that either costs to the user are kept at a mostly symbolic level or appropriate financial support is provided by the State, under the shape of scholarships or student loans. In the industrialised countries, given the usually adequate network of formal education institutions, covering the needs of the classes of age from childhood to the young adults, distance education systems are mostly addressed to providing second-chance studies for the adult population, sometimes as part-time students. Adult and Community Education are other streams of operation for these systems, as well as initial and continuing vocational training; central governments or local authorities frequently take the initiative and provide financial support to these learning activities.

The situation is rather different in the most disfavoured regions of the world, on two accounts. First there may be a serious deficit in technological infrastructures, like communication networks, computer systems, even energy distribution; second, the number and distribution of conventional formal education institutions may be clearly insufficient to cover the basic needs in this field. An appropriate answer to these difficulties is to try to boost teacher training to the highest possible level, using distance education techniques and the more conventional media; another one is to develop teleschool systems, defined as conventional classes supported by radio and/or television, more addressed to support the teacher than to teach the learners.

International co-operation is of paramount importance to pool experiences, to reduce costs, to create synergies and economies of scale. While being careful about the transfer of

learning materials from the geographical, social and cultural context where they belong, to a very different one (and this requires a significant effort of conversion and adaptation of these materials, in order to perform their cultural re-contextualisation), exchange between national distance education systems is made easier when they belong to linguistic and cultural regions presenting some degree of affinity, regardless of geographical distances.

The recognition of this fact has led to the creation of many different associations linking distance education systems across their national borders. They may have been driven by the use of a common language, by their geographical or political proximity, their social and economic strategies. We have found that ODL transnational associations frequently follow the common interest strategic alliances between countries.

At the global level, the International Council for Distance Education, ICDE, is the federative organisation of most existing ODL systems, represented in 109 countries in all the continents. It is a non-governmental organisation, recognised by the UNESCO as a category A NGO, governed by an Executive Committee including a President, Vice-Presidents representing the various regions of the world and a permanent Secretariat General set in Oslo, Norway. The very recent explosion of ICDE membership, now including educational and training governmental authorities from many countries, as well as powerful international corporations operating in the field of Information and Communication Technologies, has led to the setting up (still on its way of expanding) of a network of regional branches of the Secretariat General, in different continents.

A change in the ICDE Constitution, aimed at increasing and improving the representation of the different regions of the world, not only in geographical but also in linguistic and cultural terms, is now under way. Other new provisions have been introduced to increase the intervention capacity of the ICDE in the international scene, to improve the support given to regional and national associations and to the institutions themselves.

We believe that a clear change in the educational paradigm is nowadays occurring, whereby the autonomy and the initiative of the individual student is being given more recognition and an increased amount of self-learning materials tends to be mixed, in appropriate amounts, with conventional classroom teaching. In organisational terms, this means that a convergence between presence teaching institutions and their distance learning counterparts is also taking place, leading to a subtle change in the role of teachers: instead of being the source of all knowledge, they will become more and more the catalyst of the learning process, working together with their students in the search for a better

understanding of fact, phenomenon, environment, society, science and technology, human creativity and human values and references.

The ICDE is giving its own contribution to the analysis of the paradigm shift, through one of the permanent working groups it has constituted for this purpose. With this and many other initiatives under way, in collaboration with national authorities, transnational organisations and international agencies, we intend, as a global even if ambitious aim, to improve, to democratise and to reinforce education and training opportunities all over the world.